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EXAMINER	
BRIER, JEFFERY A	

ART UNIT	PAPER NUMBER
2628	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/617,455	QI ET AL.	
	Examiner	Art Unit	
	Jeffery A. Brier	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 July 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15 and 32-76* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15 and 32-76* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 July 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment and Remarks

1. The amendment filed on 7/3/2007 has been entered. The amendments to the claims overcomes the 112 and 101 rejections set forth in the office action mailed on 4/3/2007 except for claim 3's, 11's, and 15's 112 rejection. The replacement sheets of drawings filed on 7/3/2007 overcomes the objection to the drawings set forth in the office action mailed on 4/3/2007, however, a new issue in the drawings is set forth below. The objection to the specification set forth in the office action mailed on 4/3/2007 is withdrawn in view of applicants remarks at page 16 of the 7/3/2007 response. A new objection to the specification and drawings follows as well as a prior art rejection based upon newly discovered prior, a 112 rejection, and a 101 rejection. The remarks concerning claim 3 is not persuasive because the rendering engine as defined in claim 1 ceases evaluation of the coordinates associated with the pixels of each line of pixels upon determining that at least one pixel of the lines falls within the triangle area and a current pixel no longer falls within the triangle area and as defined in claim 3 does not cease evaluation of the coordinates associated with the pixels of each line of pixels upon determining that at least one pixel of the lines falls within the triangle area. The remarks concerning claim 11 is not persuasive for the same reasons given for claim 3. The remarks concerning claim 15 is not persuasive because the amendment to claim 1 does not give antecedent basis for "storing of pixels in cache" since the data stored is not clear and claim 1 only generates information indicating which of the pixels fall within the triangle area.

2. Applicants remarks on page 17 under the heading New Claims alleges claims 32-46 are means plus function claims however, these claims do not follow the format of means plus function claims. See MPEP 2181. Note the claimed "rendering means that" (claim 1), "means storing" (claim 40), "control means that" (claim 41), and "means that processes" (claims 42 and 43) are structure or acts for achieving a function rather than a function. Thus, these claims are treated in this office action as apparatus claims rather than means plus function claims.

Specification

3. The disclosure is objected to because of the following informalities:

in paragraph [0028] step (38) may actually be step (37) and step (39) may actually be step (38); and

in paragraph [0020] applicant used the word "leftward" at line 4 while figure 2 shows rightward.

Appropriate correction is required.

Drawings

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description:

step 37 shown in figure 3 is not described in the specification, see paragraphs [0027] and [0028].

Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

5. Claim 71 is objected to because of the following informalities: at line 2 "to f issue" appears to be a typo. Appropriate correction is required.

Claim Rejections - 35 USC § 101

6. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7. Claims 62-76 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. These claims are programs per se because they are a program product and the code claimed in the body of the claim is a computer

program rather than instructions causing a computer to perform the claimed functions. See MPEP 2106.01.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 3, 4, 8, 11, 15, 34, 35, 39, 42, 46, 49, 50, 54, 57, 61, 64, 65, 69, 72, 73, and 76 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 3:

This claim applies the coefficient matrix to each of the pixel within the rectangular area while parent claim 1 ceases evaluation upon determining that at least one pixel of the line falls within the triangle area and a current pixel no longer falls within the triangle area. Thus, the metes and bounds of claims 1 and 3 are unclear.

Claims 34, 49, and 64:

These claims correspond to claim 3 and are indefinite for the same reasons given for claim 3.

Claim 11:

This claim's rasterizer evaluates coordinates associated with the pixel values of the rectangular area while parent claim 1 ceases evaluation upon determining that at least one pixel of the line falls within the triangle area and a current pixel no longer falls

within the triangle area. Thus, the metes and bounds of claims 1 and 11 are unclear.

Claims 42, 57, and 72:

These claims correspond to claim 11 and are indefinite for the same reasons given for claim 11.

Claim 15:

This claim claims a cache memory to store at least a portion of the pixels, however, claim 1, did not generate any pixels, thus, in the claim language no pixels are present to be stored in the cache memory and it is not clear which pixels applicants intends to claim to be stored in the cache memory.

Claims 46, 61, and 76:

These claims correspond to claim 15 and are indefinite for the same reasons given for claim 15.

Claim 73:

At line 2 "the vertex buffer" lacks antecedent basis in the claim.
At line 8 "the bounding data" lacks antecedent basis in the claim.

Claim 4:

This claim claims determining whether the results of the equation are less than zero in order to determine if a current one of the pixels is within the rectangular area. This corresponds to paragraph [0029] of applicants specification which discusses a pixel is inside the triangle when all of e_1, e_2, and e_3 are less than zero. The problem is the claim claims "rectangle" while the specification describes "triangle". If the claimed rectangle is the bounding box then the claim does not distinctly claim the invention and

in view of claim 1 the rectangle is the bounding box. Thus, the metes and bounds of the claim is unclear. Note LizardTech Inc. v. Earth Resource Mapping Inc., 76 USPQ2d 1724 (Fed. Cir. 2005) and Lizardtech Inc. v. Earth Resource Mapping Inc., 77 USPQ2d 1391 (Fed. Cir. 2006).

Claims 35, 50, and 65:

These claims correspond to claim 4 and are indefinite for the same reasons given for claim 4.

Claim 8:

The definition given for M^{-1} does not correspond to the specifications definition given at equation (6) of page 6. Thus, the metes and bounds of the claim is unclear. Note LizardTech Inc. v. Earth Resource Mapping Inc., 76 USPQ2d 1724 (Fed. Cir. 2005) and Lizardtech Inc. v. Earth Resource Mapping Inc., 77 USPQ2d 1391 (Fed. Cir. 2006).

Claims 39, 54, and 69:

These claims correspond to claim 8 and are indefinite for the same reasons given for claim 8.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1, 2, 5, 6, 9, 10, 11, 12, 15, 32, 33, 36, 37, 40, 41, 42, 43, 46, 47, 48, 51, 52, 55, 56, 57, 58, 61, 62, 63, 66, 67, 70, 71, 72, 73, and 76 are rejected under 35 U.S.C. 102(b) as being anticipated by Watkins, US Patent No. 5,598,517. Watkins scans a bounding box corresponding to cache memory block containing the triangle and ceases scanning the bounding box upon determining at least one pixel of the line falls within the triangle when the scanning reaches a pixel that is no longer in the triangle. A detailed analysis of the claim follows.

Claim 1:

Watkins teaches an apparatus comprising:

a rendering engine that defines a rectangular area of pixels that bounds a triangular area of the pixels, wherein the rectangular area of pixels includes one or more lines of pixels (*Column 2 lines 39-43, column 3 lines 14-20, figure 1A and column 5 lines 28-37 and 55-62, figure 5 and column 8 lines 6-15.*);

the rendering engine further selects each of the one or more lines of pixels within the rectangular area of pixels (*Column 5 lines 55-62 and column 8 lines.*),

sequentially evaluates coordinates associated with the pixels of each line of pixels to determine whether the pixels fall within the triangle area (*Column 6 lines 1-13 and column 8 lines 23-40.*), and

ceases evaluation of the coordinates associated with the pixels of each line of pixels upon determining that at least one pixel of the line falls within the triangle area and a current pixel no longer falls within the triangle area (*Column 6 lines 1-13 and column 8 lines 23-40. Also note the ACM article incorporated by reference at column 6*

lines 48-62 and provided to applicant. "A Parallel Algorithm for Polygon Rasterization" published in Computer Graphics, Volume 22, Number 4, August 1988 by Juan Pineda and designated ACM-0-89791-275-6/88/008/0017. This article clearly teaches in section 4 traversing a bounding box and ceasing the scan and "advance to the next line when it walked off the edge of a triangle". At least the article's edge function corresponds to the claimed "information indicating which of the pixels fall within the triangle area", see section 7.) and

stores information indicating which of the pixels fall within the triangle area (*Column 5 lines 5-14, column 6 lines 40-62, column 7 lines 25-50, and column 8 lines 20-30.*).

Claim 2:

Watkins teaches the apparatus of claim 1, wherein the rendering engine evaluates the coordinates of the pixels in accordance with a set of linear equations that describe edges of the triangular area (*The processing of determining if the pixel is within the triangle is a linear operation, column 5 lines 28-37, column 6 lines 48-62 and column 8 lines 23-30 since the raster format is two dimensional the equations are linear rather than non-linear. Note the ACM article incorporated by reference at column 6 lines 48-62 and provided to applicant. "A Parallel Algorithm for Polygon Rasterization" published in Computer Graphics, Volume 22, Number 4, August 1988 by Juan Pineda and designated ACM-0-89791-275-6/88/008/0017. This article clearly teaches using linear equations to evaluate the coordinates, see page 19 section 7 first paragraph which states "Since the edge function is linear, it is possible to compute the value*

of the edge function for a pixel an arbitrary distance L away from a given point (x,y) :

E(x+L, y) = E(x) + L dy".).

Claim 5:

Watkins teaches the apparatus of claim 1, wherein the rendering engine selectively renders the pixels that fall within the triangular area by computing updated pixel data for those pixels in accordance with a set of linear equations that describe one or more attributes associated with the triangular area (*The processing of determining if the pixel is within the triangle is a linear operation, column 4 line 56 to column 5 line 5, column 5 lines 5-14, column 6 lines 41-48, column 7 lines 25-30, and column 8 lines 20-30 since the raster format is two dimensional the equations are linear rather than non-linear and since the delta values at column 6 lines 55-62 are used in linear equations. Note the ACM article incorporated by reference and provided to applicant. "A Parallel Algorithm for Polygon Rasterization" published in Computer Graphics, Volume 22, Number 4, August 1988 by Juan Pineda and designated ACM-0-89791-275-6/88/008/0017. This article clearly teaches using linear equations to generate pixel values, see page 20 first column second paragraph which states "Since color and Z components are linear as well, they may also be computed in parallel.".*).

Claim 6:

Watkins teaches the apparatus of claim 5, wherein the attribute values comprise at least one of color values and texture values (*Color and texture is discussed at column*

4 lines 64-67, column 6 lines 55-62, column 7 lines 25-30, column 8 lines 20-22, figure 3 step 44, and figure 6 step 72).

Claim 9:

Watkins teaches the apparatus of claim 1, further comprising a z-buffer storing a set of z-values associated with the pixels, and wherein the rendering engine compares a z-value, z_c, of the current pixel with a corresponding z-value, z_b, of a z-buffer to determine whether each pixel within the rectangular area is visible and selectively renders each pixel of the rectangular area that is visible and that falls within the triangle area (*The visibility test compares a current pixel's z value with a predetermined value such as applicant's z-buffer value to determine if the pixel is visible such as when* $z_c<z_b$.).

Claim 10:

Watkins teaches the apparatus of claim 1, further comprising a control unit that issues a command to the rendering engine that specifies vertices of the triangular area (*GP, column 4 lines 30-37, column 9 lines 33-36.*).

Claim 11:

Watkins teaches the apparatus of claim 1, wherein the rendering engine comprises:

a vertex buffer for buffering the vertices of the triangular area to be rendered (*GP produces vertices which need to be buffered in rendering processor RP, column 4 lines 30-37, column 5 lines 24-27, column 6 lines 40-62,*);

a bounding box generator that processes the vertices to compute bounding data that define the dimensions of the rectangular area (*Column 2 lines 39-43, column 3 lines 14-20, figure 1A and column 5 lines 28-37 and 55-62, figure 5 and column 8 lines 6-15.*); and

a rasterizer that processes the bounding data and evaluates coordinates associated with the pixel values of the rectangular area to selectively render the pixels that fall within the triangular area (*RP renders pixels based upon the bounding data and pixel coordinate to render pixel values for the pixel that fall within the triangular area. Column 5 lines 5-14, column 6 lines 40-62, column 7 lines 25-50, and column 8 lines 20-30.*).

Claim 12:

Watkins teaches the apparatus of claim 11, further comprising:

an edge coefficient generator that receives the vertices buffered by the vertex buffer and processes the vertices to compute linear coefficients for a set of linear equations that describe edges of the triangular area (*The processing of determining if the pixel is within the triangle is a linear operation, column 5 lines 28-37, column 6 lines 48-62 and column 8 lines 23-30 since the raster format is two dimensional the equations are linear rather than non-linear. Note the ACM article incorporated by reference at column 6 lines 48-62 and provided to applicant. "A Parallel Algorithm for Polygon Rasterization" published in Computer Graphics, Volume 22, Number 4, August 1988 by Juan Pineda and designated ACM-0-89791-275-6/88/008/0017. This article clearly teaches using linear equations to evaluate the coordinates that describes edges of the*

triangular area, see page 19 section 7 first paragraph which states "Since the edge function is linear, it is possible to compute the value of the edge function for a pixel an arbitrary distance L away from a given point (x,y) :

E(x+L, y) = E(x) + L dy".) , and

an attribute coefficient generator that processes the vertices to compute linear coefficients for a set of linear equations that describe one or more attributes associated with the triangular area (*Color and texture is discussed at column 4 lines 64-67, column 6 lines 55-62, column 7 lines 25-30, column 8 lines 20-22, figure 3 step 44, and figure 6 step 72, as well as the Pineda article at section 7.*), wherein

the rasterizer processes the bounding data and the coefficients in accordance with the sets of linear equations to render the pixels that fall within the triangular area (*Column 5 lines 5-14, column 6 lines 40-62, column 7 lines 25-50, and column 8 lines 20-30.*).

Clam 15:

Watkins teaches the apparatus of claim 1, further comprising a cache memory to store at least a portion of the pixels, wherein the cache memory has a block size (*Column 2 lines 37-43, column 3 lines 14-20, column 6 lines 17-40, and column 7 lines 14-16 and 60-65 discusses using a texture cache and a frame buffer cache and having the triangle area scanned corresponding to the cache organization. The article incorporated by reference "FBRAM: A New Form of Memory Optimized for 3D Graphics" published at Siggraph 94 by Deering, Schlapp and Lavelle and printed in the*

proceedings designated ACM-0-89791-667-0/94/007/0167, further teaches having the caches designed as squares or rectangles which corresponds to Watkin's spans 10a, 10b, 62, and 64 and panels 66 or 67, see column 8 lines 7-15.), and the rendering engine defines the rectangular area as a function of the block size of the cache (*Column 2 lines 37-43 and column 3 lines 14-20 teaches to one of ordinary skill in the art the spans or panels are defined to correspond to the block size of the frame buffer cache memory.*).

Claims 32, 33, 36, 37, 40, 41, 42, 43, and 46:

These apparatus claims are very similar to apparatus claims 1, 2, 5, 6, 9, 10, 11, 12, and 15 and they are rejected for the same reasons. Also note applicants remarks at page 17 under the heading New Claims. Also note the examiner comments above under Response to Amendments and Remarks concerning the means plus function statues of these claims. If these claims were amended to be proper means plus function claims then the means of Watkins is considered to be the same or equivalent to the claimed means.

Claims 47, 48, 51, 52, 55, 56, 57, 58, and 61:

These method claims are method claim version of apparatus claims 1, 2, 5, 6, 9, 10, 11, 12, and 15 and they are rejected for the same reasons. Also note applicants remarks at page 17 under the heading New Claims.

Claims 62, 63, 66, 67, 70, 71, 72, 73, and 76:

These computer program product claims are computer program product claim versions of method claims 47, 48, 51, 52, 55, 56, 57, 58, and 61 and of apparatus

claims 1, 2, 5, 6, 9, 10, 11, 12, and 15 and they are rejected for the same reasons. Also note applicants remarks at page 17 under the heading New Claims. Additionally note column 3 line 66 to column 4 line 10.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

14. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

15. Claims 3, 7, 34, 38, 49, 53, 64, and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watkins, US Patent No. 5,598,517, and in view of the incorporated by reference article "A Parallel Algorithm for Polygon Rasterization" published in Computer Graphics, Volume 22, Number 4, August 1988 by Juan Pineda and designated ACM-0-89791-275-6/88/008/0017.

Claim 3:

This claim claims the method of claim 2, wherein the rendering engine computes a coefficient matrix M_C for computing linear coefficients for the set of linear equations; and

applies the coefficient matrix M_C to each of the pixels within the rectangular area to determine whether each of the pixels falls within the triangular area.

Watkins teaches as discussed for claim 2 the processing of determining if the pixel is within the triangle is a linear operation, column 5 lines 28-37, column 6 lines 48-62 and column 8 lines 23-30 since the raster format is two dimensional the equations are linear rather than non-linear. Note the ACM article incorporated by reference at column 6 lines 48-62 and provided to applicant. "A Parallel Algorithm for Polygon Rasterization" published in Computer Graphics, Volume 22, Number 4, August 1988 by Juan Pineda and designated ACM-0-89791-275-6/88/008/0017. This article clearly teaches using linear equations to evaluate the coordinates, see page 19 section 7 first

paragraph which states "Since the edge function is linear, it is possible to compute the value of the edge function for a pixel an arbitrary distance L away from a given point (x,y) :

E(x+L, y) = E(x) + L dy".).

Both Watkins and the article incorporated by reference, "A Parallel Algorithm for Polygon Rasterization", does not expressly discuss computing a coefficient matrix M_C for computing linear coefficients for the set of linear equations and does not expressly discuss applying the coefficient matrix M_C to each of the pixels within the rectangular area to determine whether each of the pixels falls within the triangular area.

However, in view of the article computing and applying such a matrix as claimed would have been obvious to one of ordinary skill in the art at the time of applicants invention because the equations in the article in section 3 may be represented in a mathematically more simplified form by a coefficient matrix.

Claim 34:

This apparatus claim is very similar to apparatus claim 3 and it is rejected for the same reasons. Also note applicants remarks at page 17 under the heading New Claims. Also note the examiner comments above under Response to Amendments and Remarks concerning the means plus function statues of these claims. If these claims were amended to be proper means plus function claims then the means of Watkins is considered to be the same or equivalent to the claimed means.

Claim 49:

This method claim is a method claim version of apparatus claim 3 and it is rejected for the same reasons. Also note applicants remarks at page 17 under the heading New Claims.

Claim 64:

This computer program product claim is a computer program product claim version of method claim 49 and of apparatus claim 3 and it is rejected for the same reasons. Also note applicants remarks at page 17 under the heading New Claims. Additionally note column 3 line 66 to column 4 line 10.

Claim 7:

This claim claims the method of claim 5, wherein the rendering engine computes

a coefficient matrix M^{-1} for computing linear coefficients A, B, C of the set of linear equations; and

applies the linear coefficients A, B, C to each of the pixels that falls within the triangular area to compute an attribute value for each of the pixels.

Watkins teaches as discussed for claim 5 the processing of determining if the pixel is within the triangle is a linear operation, column 4 line 56 to column 5 line 5, column 5 lines 5-14, column 6 lines 41-48, column 7 lines 25-30, and column 8 lines 20-30 since the raster format is two dimensional the equations are linear rather than non-linear and since the delta values at column 6 lines 55-62 are used in linear equations. Note the ACM article incorporated by reference and provided to applicant. "A Parallel Algorithm for Polygon Rasterization" published in Computer Graphics, Volume 22,

Number 4, August 1988 by Juan Pineda and designated ACM-0-89791-275-6/88/008/0017. This article clearly teaches using linear equations to generate pixel values, see page 20 first column second paragraph which states "Since color and Z components are linear as well, they may also be computed in parallel.".).

Both Watkins and the article incorporated by reference, "A Parallel Algorithm for Polygon Rasterization", does not expressly discuss computing a coefficient matrix M_C for computing linear coefficients of the set of linear equations and however Watkins does discuss applying the linear coefficients to each of the pixels that falls within the triangular area to compute an attribute value for each of the pixels as discussed above for claim 6 (Color and texture is discussed at column 4 lines 64-67, column 6 lines 55-62, column 7 lines 25-30, column 8 lines 20-22, figure 3 step 44, and figure 6 step 72).

However, in view of the article computing a matrix as claimed would have been obvious to one of ordinary skill in the art at the time of applicants invention because the equations in the article in section 3 may be represented in a mathematically more simplified form by a coefficient matrix.

Claim 38:

This apparatus claim is very similar to apparatus claim 7 and it is rejected for the same reasons. Also note applicants remarks at page 17 under the heading New Claims. Also note the examiner comments above under Response to Amendments and Remarks concerning the means plus function statues of these claims. If these claims were amended to be proper means plus function claims then the means of Watkins is considered to be the same or equivalent to the claimed means.

Claim 53:

This method claim is a method claim version of apparatus claim 7 and it is rejected for the same reasons. Also note applicants remarks at page 17 under the heading New Claims.

Claim 68:

This computer program product claim is a computer program product claim version of method claim 53 and of apparatus claim 3 and it is rejected for the same reasons. Also note applicants remarks at page 17 under the heading New Claims. Additionally note column 3 line 66 to column 4 line 10.

16. Claims 13, 14, 44, 45, 59, 60, 74, and 75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watkins, US Patent No. 5,598,517, in view of applicant admission of the prior art. Claim 13 places claim 1 into a wireless communication device and claim 14 places claim 1 into an integrated circuit.

Claim 13:

Applicant at pages 1 and 2 discuss using graphics renders in wireless communication devices. It would have been obvious to one of ordinary skill in the art at the time of applicants invention to use the teachings of Watkins in a prior art wireless communication device because it will provide the device with the advantages noted by applicant in the paragraph spanning pages 1 and 2 as well as paragraphs 6-10 at page 2.

Claim 44:

This apparatus claim is very similar to apparatus claim 13 and it is rejected for the same reasons. Also note applicants remarks at page 17 under the heading New Claims. Also note the examiner comments above under Response to Amendments and Remarks concerning the means plus function statues of these claims. If these claims were amended to be proper means plus function claims then the means of Watkins is considered to be the same or equivalent to the claimed means.

Claim 59:

This method claim is a method claim version of apparatus claim 13 and it is rejected for the same reasons. Also note applicants remarks at page 17 under the heading New Claims.

Claim 74:

This computer program product claim is a computer program product claim version of method claim 59 and of apparatus claim 13 and it is rejected for the same reasons. Also note applicants remarks at page 17 under the heading New Claims. Additionally note column 3 line 66 to column 4 line 10.

Claim 14

Applicant at page 3 paragraph 2 gives many examples of applicants implementation which states: Processor 6 may take the form of an embedded microprocessor, specialized hardware, software, e.g., a control software module, or combinations thereof. Moreover, DSP 10, processor 6, rendering engine 12, as well as other components of mobile computing, device 2, may be implemented in one or more

application-specific integrated circuits (ASICs), as multiple discrete components, or combinations thereof. Applicant at pages 1 and 2 discuss using graphics renders in mobile devices such as PDAs which inherently have integrated circuits. It would have been obvious to one of ordinary skill in the art at the time of applicants invention to use the teachings of Watkins in an integrated circuit because it will provide the device with the advantages noted by applicant in the paragraph spanning pages 1 and 2 as well as paragraphs 6-10 at page 2 in addition to allow for a device such as a PDA to be mobile.

Claim 45:

This apparatus claim is very similar to apparatus claim 14 and it is rejected for the same reasons. Also note applicants remarks at page 17 under the heading New Claims. Also note the examiner comments above under Response to Amendments and Remarks concerning the means plus function statues of these claims. If these claims were amended to be proper means plus function claims then the means of Watkins is considered to be the same or equivalent to the claimed means.

Claim 60:

This method claim is a method claim version of apparatus claim 14 and it is rejected for the same reasons. Also note applicants remarks at page 17 under the heading New Claims.

Claim 75:

This computer program product claim is a computer program product claim version of method claim 60 and of apparatus claim 14 and it is rejected for the same

reasons. Also note applicants remarks at page 17 under the heading New Claims. Additionally note column 3 line 66 to column 4 line 10.

Conclusion

17. A proper prior art analysis of the claims 4, 8, 35, 39, 50, 54, 65, and 69 cannot be made because the metes and bounds of the claims are not definite and because the specification does not support the claims. Thus, a prior art rejection cannot be made with the currently pending claims. In re Steele, 305 F.2d 859,134 USPQ 292 (CCPA 1962) (it is improper to rely on speculative assumptions regarding the meaning of a claim and then base a rejection under 35 U.S.C. 103 on these assumptions). If these claims were amended to be in alignment with the specification then they would be rejected under 35 USC 103 as being obvious at the time of applicants invention to one of ordinary skill in the art to use matrix coefficients to determine if a current pixel is within a triangle (claims 4, 35, 50, and 65) and to determine the attributes of the pixel (claims 8, 39, 54, and 69).

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Triangle Rendering Algorithm, June 1, 1992 (19920601), IBM Technical Disclosure Bulletin, June 1992, US, Vol. No. 35, Issue No. 1B, pages 151-157, discusses surrounding a triangle with a bounding box and in one embodiments scanning the entire bounding box surrounding the triangle and in a second embodiments only scanning within the triangle and gives reasons in the last sentence of

the following passage of this document for not scanning all points within the bounding box.:

- The next step in the process is to determine the coefficients of the lines containing the bounding vectors. From equations (1): A1 = y2 - y1 A2 = y3 - y2 A3 = y1 - y3 B1 = x2 - x1 B2 = x3 - x2 B3 = x1 - x3 C1 = x2y1 - x1y2 C2 = x3y2 - x2y3 C3 = x1y3 - x3y1 Note that except for changes of sign, the three terms in the right side of equation (3) correspond to the the three Cn constants above and need not be recalculated. - Rearranging the standard form of a line equation to eliminate the constant 0, we now have the equations of three lines that bound the triangle: B1y = A1x + C1 B2y = A2x + C2 B3y = A3x + C3 Because of our assumption that all triangles have been forced to positive polarity, if for any pixel at (x,y) the left side of each of these relations evaluates to less than that of the right side, the pixel is within the boundaries of the triangle. If for any of these relationships the left and right sides are equal, the pixel is precisely on one of the boundary vectors. - Since pixels exist at discrete coordinates, the values of x and y are always integral. The left and right sides of the functions may therefore be determined incrementally as the bounding box is scanned. Assuming that the bounding box is to be scanned from the minimum value of each axis to the maximum, initial values for each side of each relationship may be found: L10 = B1y_min R10 = A1x_min + C1 L20 = B2y_min R20 = A2x_min + C2 L30 = B3y_min R30 = A3x_min + C3 Subsequent values of Ln and Rn may be determined by: Ln[i+1] = Ln[i] + Bn Rn[i+1] = Rn[i] + An An algorithm implementing the above may be devised such that it does not contain any arithmetic divide operations or any multiplication operations inside loops. The algorithm is thus highly efficient. - Variations on this algorithm could include a mechanism to conditionally update pixels exactly on the perimeter of the triangle. This is useful when drawing adjacent triangles, and may be done by making the inner-loop test more versatile. Another variation could be a different mechanism to handle triangle polarity. - As this algorithm has been presented, it will scan the entire bounding box surrounding the triangle, which will contain roughly twice as many pixels as the triangle itself. This inefficiency may be nearly eliminated by starting the x axis (inner loop) scan from a point central to the bounding box and stepping simultaneously in opposite directions, stopping each branch when the scan passes out of the triangle. (emphasis added by underlining)

Kato, US Patent Application Publication No. 2004/0164985, is an intervening reference that determines pixels values within the triangle without determining all of the pixel values of the box surrounding the triangle.

Wiedenman et al., US Patent No. 4,646,076, and Wang US Patent No. 4,897,805, determine pixel values for complex polygons within boundaries.

Aleksic, US Patent No. 5,914,722, discusses a bounding box corresponding to a memory page and determine pixel values with the triangle and ceasing scanning when the scan is at the edge of the triangle as seen in figure 7 for Page and discussed at column 4 lines 26-35.

Koneru et al., US Patent No. 6,693,637, places a bounding box around a polygon and determines the memory locations of the polygon.

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffery A Brier whose telephone number is (571) 272-7656. The examiner can normally be reached on M-F from 7:30 to 4:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi, can be reached at (571) 272-7664. The fax phone Number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Jeffery A. Brier/
Primary Examiner, Division 2628